



PLENARY MEETING

[CITEL Administrations]

PROPOSALS FOR THE WORK OF THE CONFERENCE

(This file includes the modification to item 1.8 from the XV meeting and the new table of support result from that meeting.)

TABLE OF SUPPORT TO THE INTER-AMERICAN PROPOSALS (IAP) 1-73

IAP #	Topic	Agenda item	A T G	A R G	B A H	B R B	B L Z	B O L	B	C A N	C H L	C L M	C T R	D M A	E Q A	S L V	G R D	G T M	G U Y	H T I	H N D	J M E	M C X	N C G	P N R	P R G	P R U	D O M	S C N	L C A	V C T	S U R	T R D	U S A	U R E	V E N			
1-8	Appendix S3	1.2		x					x	x		x			x	x																				x	x		
9-14	Proposal for the Confirmation of the Fixed Service Allocation in the 31.8-33.4 GHz Frequency Range (Resolution 126 and 726)	1.4		x					x	x		x	x		x	x		x																			x	x	
15	Identification of a global radio control channel to facilitate multimode terminal operation and worldwide roaming of IMT-2000	1.6.2		x					x	x		x	x		x	x		x					x				x										x	x	
16-41	Proposal to protect the operational, distress and safety communications in the HF bands used by the aeronautical mobile (R) and maritime mobile services	1.7		x					x	x		x	x		x	x							x														x	x	
42-45	Proposal for communications by earth stations on board vessels using frequencies allocated to the fixed-satellite service and used by existing space segment in the fixed-satellite service	1.8		x					x	x			x		x			x					x				x										x	x	x
46-47	Evaluation of the feasibility of an allocation in the space-to-Earth direction to the mobile-satellite service in a portion of the 1 559 - 1 567 MHz frequency range, in response to Resolutions 213 and 220 (WRC-97)	1.9		x					x	x		x	x		x								x				x										x	x	x
48-49	Proposal for the modification of S5.541A and the suppression of Resolution 121	1.12		x					x	x		x	x		x								x														x	x	
50-52	Remove the 15.43-15.63 GHz space-to-Earth allocation from the Tables of Article RR S5	1.14							x	x		x	x		x								x														x	x	
53-56	Proposal for worldwide allocation to the Earth exploration-satellite (passive) services in the band 18.6-18.8 GHz on a primary basis	1.17		x					x		x	x		x									x														x	x	
57-73	Proposal to modify Appendix S18 and Resolution 342	1.18							x		x	x		x									x														x	x	

TABLE OF CONTENTS

WRC-2000 Agenda Item 1.2.....	5
To finalize remaining issues in the review of Appendix S3 to the Radio Regulations with respect to spurious emissions for space services, taking into account Recommendation 66 (Rev.WRC-97) and the decisions of WRC-97 on adoption of new values, due to take effect at a future time, of spurious emissions for space services	
WRC-2000 Agenda Item 1.4.....	14
To consider issues concerning allocations and regulatory aspects related to Resolutions 126 (WRC-97), 128 (WRC-97), 129 (WRC-97), 133 (WRC-97), 134 (WRC-97) and 726 (WRC-97);	
Proposal for the Confirmation of the Fixed Service Allocation in the 31.8 – 33.4 GHz Frequency Range (Resolution 126 and 726)	14
WRC-2000 Agenda Item 1.6.2.....	17
Identification of a global radio control channel to facilitate multimode terminal operation and worldwide roaming of IMT-2000.....	
WRC-2000 Agenda Item 1.7.....	18
Review of the use of the HF bands by the aeronautical mobile (R) and maritime mobile services with a view to protecting operational, distress and safety communications, taking into account Resolution 346 (WRC-97).....	
Proposal to protect the operational, distress and safety communications in the HF bands used by the aeronautical mobile (R) and maritime mobile services	18
WRC-2000 Agenda Item 1.8.....	29
To consider regulatory and technical provisions to enable earth stations located on board vessels to operate in the fixed-satellite service (FSS) networks in the bands 3 700 - 4 200 MHz and 5 925 - 6 425 MHz, including their coordination with other services allocated in these bands;	
Proposal for communications by earth stations on board vessels using frequencies allocated to the fixed-satellite service and used by existing space segment in the fixed-satellite service.....	29
WRC-2000 Agenda Item 1.9.....	35
To take into account the results of ITU-R studies in evaluating the feasibility of an allocation in the space-to-Earth direction to the mobile-satellite service in a portion of the 1 559 - 1 567 MHz frequency range, in response to Resolutions 213 and 220 (WRC-97).....	
WRC-2000 Agenda Item 1.12.....	38
To consider progress of studies on sharing between feederlinks of non-geostationary satellite networks in the mobile satellite service and geostationary-satellite networks in the fixed satellite service in the bands 19.3-19.7 GHz and 29.1-29.5 GHz, taking into account Resolution 121 (Rev.WRC-97).....	
Proposal for the modification of S5.541A and the suppression of Resolution 121	38
WRC-2000 Agenda Item 1.14.....	40
To review the results of the studies on the feasibility of implementing non-GSO MSS feeder links in the 15.43-15.63 GHz in accordance with Resolution 123 (WRC-97).....	
Remove the 15.43-15.63 GHz space-to-Earth allocation from the Tables of Article RR S5	40
WRC-2000 Agenda Item 1.17.....	42
To consider possible worldwide allocation for the earth exploration-satellite (passive) and space research (passive) service in the band 18.6 - 18.8 GHz, taking into account the results of the ITU-R studies	
Proposal for worldwide allocation to the Earth exploration-satellite (passive) services in the band 18.6-18.8 GHz on a primary basis.....	42

WRC-2000 Agenda Item 1.18.....46

 To consider the use of new digital technology for the maritime mobile service in the band 156 - 174 MHz and consequential revision of Appendix 18/S18, taking into account Resolution 342 (WRC-97);46

 Proposal to modify Appendix S18 and Resolution 342.....46

WRC-2000 Agenda Item 1.2

To finalize remaining issues in the review of Appendix S3 to the Radio Regulations with respect to spurious emissions for space services, taking into account Recommendation 66 (Rev.WRC-97) and the decisions of WRC-97 on adoption of new values, due to take effect at a future time, of spurious emissions for space services

Background Information: Recommendation No. 66 (Rev. WRC-97) directs the ITU-R to submit a report to WRC-2000 with a view to finalizing the space services spurious emissions limits in Appendix S3 of the Radio Regulations. The CITEL administrations propose text that would remove the “design objectives” designation from the space services spurious emissions limits and make related appropriate modifications applicable to deep-space systems, satellites with spurious emissions falling within the necessary bandwidth of another transmitter on the same satellite, and amateur earth stations below 30 MHz. Also, the CITEL administrations propose to adequately recognize the case of very narrowband and unmodulated signals, particularly for the space services. Furthermore, the CITEL administrations propose to correct an oversight in Appendix S3 regarding limits for the radiodetermination service, and specify that spurious emission levels for radar systems be determined from radiated emissions.

Proposal(s):

APPENDIX S3

Table of Maximum Permitted Spurious Emission Power Levels

(See Article S3)

APS3

1. The following sections indicate the maximum permitted levels of spurious emissions, in terms of power as indicated in the tables, of any spurious component supplied by a transmitter to the antenna transmission line. Section I is applicable until 1 January 2012 to transmitters installed on or before 1 January 2003; Section II is applicable to transmitters installed after 1 January 2003 and to all transmitters after 1 January 2012. This Appendix does not cover out-of-band emissions. Out-of-band emissions are dealt with in No. S4.5 of the Radio Regulations.
2. Spurious emission from any part of the installation, other than the antenna and its transmission line, shall not have an effect greater than would occur if this antenna system were supplied with the maximum permitted power at that spurious emission frequency.
3. These levels shall not, however, apply to emergency position-indicating radiobeacon (EPIRB) stations, emergency locator transmitters, ships' emergency transmitters, lifeboat transmitters, survival craft stations or maritime transmitters when used in emergency situations.
4. For technical or operational reasons, more stringent levels than those specified may be applied to protect specific services in certain frequency bands. The levels applied to protect these services, such as safety and passive services, shall be those agreed upon by the appropriate world radiocommunication conference. More stringent levels may also be fixed by specific agreement between the administrations concerned. Additionally, special consideration of transmitter spurious emissions may be required for the protection

of safety services, radio astronomy and space services using passive sensors. Information on the levels of interference detrimental to radio astronomy, Earth exploration satellites and meteorological passive sensing is given in the most recent version of Recommendation ITU-R SM.329.

5. Spurious emission limits for combined radiocommunication and information technology equipment are those for the radiocommunication transmitters.

Section I. Spurious Emission Limits for Transmitters Installed on or Before 1 January 2003 (valid until 1 January 2012)

**IAP/14/1
MOD**

6. Radar systems are exempt from spurious emission limits under this section. ~~The measurement methods for radar systems should be guided by Recommendation ITU-R M.1177. For those radar systems for which acceptable methods of measurement do not exist, The lowest practicable power of spurious emission should be achieved.~~

TABLE I

**Attenuation values and absolute mean power levels used to calculate maximum
permitted spurious emission power levels for use with radio equipment**

Frequency band containing the assignment (lower limit exclusive, upper limit inclusive)	For any spurious component, the attenuation (mean power within the necessary bandwidth relative to the mean power of the spurious component concerned) shall be at least that specified below and the absolute mean power levels given shall not be exceeded (Note 1)
9 kHz to 30 MHz	40 decibels 50 milliwatts 2), 3), 4)
30 MHz to 235 MHz – mean power above 25 watts – mean power 25 watts or less	60 decibels 1 milliwatts 5) 40 decibels 25 microwatts
235 MHz to 960 MHz – mean power above 25 watts – mean power 25 watts or less	60 decibels 20 milliwatts 6), 7) 40 decibels 25 microwatts 6), 7)
960 MHz to 17.7 GHz – mean power above 10 watts – mean power 10 watts or less	50 decibels 100 milliwatts 6), 7), 8), 9) 100 microwatts 6), 7), 8), 9)

Above 17.7 GHz	The lowest possible values achievable shall be employed (see Recommendation 66 (Rev.WRC-97)).
----------------	---

Notes to Table I

¹ When checking compliance with the provisions of the table, it shall be verified that the bandwidth of the measuring equipment is sufficiently wide to accept all significant components of the spurious emission concerned.

² For mobile transmitters which operate below 30 MHz, any spurious component shall have an attenuation of at least 40 decibels without exceeding the value of 200 milliwatts, but every effort should be made to comply with the level of 50 milliwatts wherever practicable.

³ For transmitters of a mean power exceeding 50 kilowatts which can operate on two or more frequencies covering a frequency range approaching an octave or more, while a reduction below 50 milliwatts is not mandatory, a minimum attenuation of 60 decibels shall be provided.

⁴ For hand-portable equipment of mean power less than 5 watts, the attenuation shall be 30 decibels, but every practicable effort should be made to attain 40 decibels attenuation.

⁵ Administrations may adopt a level of 10 milliwatts provided that harmful interference is not caused.

⁶ Where several transmitters feed a common antenna or closely spaced antennas on neighbouring frequencies, every practicable effort should be made to comply with the levels specified.

⁷ Since these levels may not provide adequate protection for receiving stations in the radio astronomy and space services, more stringent levels might be considered in each individual case in the light of the geographical position of the stations concerned.

⁸ These levels are not applicable to systems using digital modulation techniques, but may be used as a guide. Values for these systems may be provided by the relevant ITU-R Recommendations, when available (see Recommendation **66 (Rev.WRC 97)**).

⁹ These levels are not applicable to stations in the space services, but the levels of their spurious emissions should be reduced to the lowest possible values compatible with the technical and economic constraints to which the equipment is subject. Values for these systems may be provided by the relevant ITU-R Recommendations, when available (see Recommendation **66 Rev.WRC-97**)).

**Section II. Spurious Emission Limits for Transmitters
Installed After 1 January 2003 and for All
Transmitters After 1 January 2012**

Application of these limits

**IAP/14/2
MOD**

7. The frequency range of the measurement of spurious emissions is from 9 kHz to 110 GHz or the second harmonic if higher.

8. Guidance regarding the methods of measuring spurious emissions is given in the most recent version of Recommendation ITU-R SM.329. The e.i.r.p. method specified in that Recommendation should be used when it is not possible to measure the power supplied to the antenna transmission line, or for specific applications, such as radars, where the antenna is designed to provide significant attenuation at the spurious frequencies. Additionally, the e.i.r.p. method may need some modification for special cases, e.g. beam-forming radars.

9. Guidance regarding the methods of measuring spurious emissions from radar systems is given in the most recent version of Recommendation ITU-R M.1177. The reference bandwidths required for proper measurement of radar spurious emissions should be calculated for each particular radar system. Thus, for the three general types of radar pulse modulation utilized for radionavigation, radiolocation, acquisition, tracking and other radiodetermination functions, the reference bandwidth values should be:

- for fixed-frequency, non-pulse-coded radar, one divided by the radar pulse length, in seconds (e.g. if the radar pulse length is 1 microsecond, then the reference bandwidth is $1/1\mu\text{s} = 1\text{ MHz}$);
- for fixed-frequency, phase coded pulsed radar, one divided by the phase chip length, in seconds (e.g. if the phase coded chip is 2 microseconds long, then the reference bandwidth is $1/2\mu\text{s} = 500\text{ kHz}$);
- for frequency modulated (FM) or chirped radar, the square root of the quantity obtained by dividing the radar bandwidth in MHz by the pulse length, in seconds (e.g. if the FM is from 1 250 to 1 280 MHz or 30 MHz during the pulse of 10 microseconds, then the reference bandwidth is $(30\text{ MHz}/10\mu\text{s})^{1/2} = 1.73\text{ MHz}$).

For those radar systems for which acceptable methods of measurement do not exist, the lowest practicable power of spurious emission should be achieved.

10. The spurious emission levels are specified in the following reference bandwidths:

- 1 kHz between 9 kHz and 150 kHz
- 10 kHz between 150 kHz and 30 MHz
- 100 kHz between 30 MHz and 1 GHz
- 1 MHz above 1 GHz

As a special case, the reference bandwidth of all space service spurious emissions should be 4 kHz.

11. For the purpose of setting limits, all emissions, including harmonic emissions, intermodulation products, frequency conversion products and parasitic emissions, which

fall at frequencies separated from the centre frequency of the emission by $\pm 250\%$, or more, of the necessary bandwidth of the emission will generally be considered as spurious emissions. However, this frequency separation may be dependent on the type of modulation used, the maximum bit rate in the case of digital modulation, the type of transmitter and frequency coordination factors. For example, in the case of digital (including digital broadcasting) modulation systems, broadband systems, pulsed modulation systems and narrow-band high power transmitters, the frequency separation may need to differ from the $\pm 250\%$ factor. For multichannel or multicarrier transmitters/transponders, where several carriers may be transmitted simultaneously from a final output amplifier or an active antenna, the centre frequency of the emission is taken to be the centre of the -3 dB bandwidth of the transmitter or transponder and the necessary bandwidth is taken to be the transmitter or transponder bandwidth.

**IAP/14/3
ADD**

11 bis. As an emitted signal becomes more and more narrow (to the limiting case of an unmodulated carrier with theoretical necessary bandwidth of zero), the application of the term “necessary bandwidth” as used in determining the region where spurious emission limits apply to space services, becomes more and more difficult. In the limit, $\pm 250\%$ of necessary bandwidth (generally recognised as establishing the region beyond which spurious emissions are defined), approaches zero. Beacon and other unmodulated signals, such as those used in uplink and downlink circuits in control and tracking of satellites, are examples of a case where it is difficult to practically apply the term “necessary bandwidth” in determining where out-of-band emissions end, and spurious emissions begin. Pending further studies and definitive action by a future World Radiocommunication Conference, in calculating the region where spurious emission limits apply for transmitters using amplifiers to pass essentially an unmodulated signal (or a signal with very small bandwidth), the amplifier bandwidth is taken to be the necessary bandwidth (in calculating the regions where spurious emissions apply).

**IAP/14/4
ADD**

11 ter For satellites employing more than one transponder, and when considering the limits for spurious emission as indicated by Headnote 11 to Appendix S3, spurious emissions from one transponder may fall on a frequency at which a companion, second transponder is transmitting or in the guard band between two transponders. In this situation, the level of spurious emission from the first transponder is well exceeded by fundamental emissions of the second transponder or within the guard bands between the different transponders. Therefore, limits in this appendix do not apply to those spurious emissions on a satellite which fall within the bands where there are transmissions from the same satellite into the same service area.

12. Examples of applying $43 + 10 \log (P)$ to calculate attenuation requirements

Where specified in relation to mean power, spurious emissions are to be at least x dB below the total mean power P , i.e. $-x$ dBc. The power P (in watts) is to be measured in a bandwidth wide enough to include the total mean power. The spurious emissions are to be measured in the reference bandwidths given in the Recommendation. The measurement of the spurious emission power is independent of the value of necessary bandwidth. Because the absolute emission power limit, derived from $43 + 10 \log (P)$, can become too stringent for high-power transmitters, alternative relative powers are also provided in Table II.

Example 1

A land mobile transmitter, with any value of necessary bandwidth, must meet a spurious emission attenuation of $43 + 10 \log (P)$, or 70 dBc, whichever is less stringent. To measure spurious emissions in the frequency range between 30 MHz and 1 000 MHz, Recommendation ITU-R SM.329-7 *recommends* 4.1 indicates the use of a reference bandwidth of 100 kHz. For other frequency ranges, the measurement must use the appropriate reference bandwidths given in *recommends* 4.1.

With a measured total mean power of 10 watts:

- Attenuation relative to total mean power = $43 + 10 \log (10) = 53$ dBc.
- The 53 dBc is less stringent than 70 dBc, so the 53 dBc value is used.
- Therefore: Spurious emissions must not exceed 53 dBc in a 100 kHz bandwidth, or converting to an absolute level, spurious emissions must not exceed 10 dBW – 53 dBc = –43 dBW in a 100 kHz reference bandwidth.

With a measured total mean power of 1 000 watts:

- Attenuation relative to total mean power = $43 + 10 \log (1\ 000) = 73$ dBc.
- The 73 dBc is more stringent than 70 dBc limit, so the 70 dBc value is used.
- Therefore: Spurious emissions must not exceed 70 dBc in a 100 kHz bandwidth, or converting to an absolute level, spurious emissions must not exceed 30 dBW – 70 dBc = –40 dBW in a 100 kHz reference bandwidth.

Example 2

A space service transmitter with any value of necessary bandwidth must meet a spurious emission attenuation of $43 + 10 \log (P)$, or 60 dBc, whichever is less stringent. To measure spurious emissions at any frequency, Note 1 to Table II indicates using a reference bandwidth of 4 kHz.

With a measured total mean power of 20 watts:

- Attenuation relative to total mean power = $43 + 10 \log (20) = 56$ dBc.
- The 56 dBc is less stringent than the 60 dBc limit, so the 56 dBc value is used.
- Therefore: Spurious emissions must not exceed 56 dBc in a 4 kHz reference bandwidth, or converting to an absolute level, spurious emissions must not exceed 13 dBW – 56 dBc = –43 dBW in a 4 kHz reference bandwidth.

TABLE II
Attenuation values used to calculate maximum permitted spurious emission
power levels for use with radio equipment

Service category in accordance with Article S1, or equipment type ¹⁵⁾	Attenuation (dB) below the power supplied to the antenna transmission line
All services except those services quoted below:	$43 + 10 \log (P)$, or 70 dBc, whichever is less stringent
Space services (earth stations) 10), 14) , <u>16)</u>	$43 + 10 \log (P)$, or 60 dBc, whichever is less stringent
Space services (space stations) 10), 14) , <u>17)</u>	$43 + 10 \log (P)$, or 60 dBc, whichever is less stringent
Radiodetermination ¹⁴⁾	$43 + 10 \log (PEP)$, or 60 dB, whichever is less stringent
Broadcast television ¹¹⁾	$46 + 10 \log (P)$, or 60 dBc, whichever is less stringent, without exceeding the absolute mean power level of 1 mW for VHF stations or 12 mW for UHF stations. However, greater attenuation may be necessary on a case by case basis.
Broadcast FM	$46 + 10 \log (P)$, or 70 dBc, whichever is less stringent; the absolute mean power level of 1 mW should not be exceeded
Broadcasting at MF/HF	50 dBc; the absolute mean power level of 50 mW should not be exceeded
SSB from mobile stations ¹²⁾	43 dB below <i>PEP</i>
Amateur services operating below 30 MHz (including with SSB) ¹²⁾ , <u>16)</u>	$43 + 10 \log (PEP)$, or 50 dB, whichever is less stringent

TABLE II (END)

Service category in accordance with Article S1, or equipment type ¹⁵⁾	Attenuation (dB) below the power supplied to the antenna transmission line
Services operating below 30 MHz, except space, radiodetermination, broadcast, those using SSB from mobile stations, and amateur ¹²⁾	$43 + 10 \log (X)$, or 60 dBc, whichever is less stringent, where $X = PEP$ for SSB modulation, and $X = P$ for other modulation
Low-power device radio equipment ¹³⁾	$56 + 10 \log (P)$, or 40 dBc, whichever is less stringent
Emergency position-indicating radio beacon Emergency locator transmitter Personal location beacon Search and rescue transponder Ship emergency, lifeboat and survival craft transmitters Land, aeronautical or maritime transmitters when used in emergency	No limit

P: mean power in watts supplied to the antenna transmission line, in accordance with No. **S1.158**. When burst transmission is used, the mean power *P* and the mean power of any spurious emissions are measured using power averaging over the burst duration.

PEP: peak envelope power in watts supplied to the antenna transmission line, in accordance with No. **S1.157**.

dBc: decibels relative to the unmodulated carrier power of the emission. In the cases which do not have a carrier, for example in some digital modulation schemes where the carrier is not accessible for measurement, the reference level equivalent to dBc is decibels relative to the mean power *P*.

Notes to Table II

¹⁰ Spurious emission limits for all space services are stated in a 4 kHz reference bandwidth.

¹¹ For analogue television transmissions, the mean power level is defined with a specified video signal modulation. This video signal has to be chosen in such a way that the maximum mean power level (e.g. at the video signal blanking level for negatively modulated television systems) is supplied to the antenna transmission line.

¹² All classes of emission using SSB are included in the category "SSB".

¹³ Low-power radio devices having a maximum output power of less than 100 mW and intended for short-range communication or control purposes; such equipment is in general exempt from individual licensing.

IAP/14/6

MOD

¹⁴ ~~These values are “design objectives”. This note will not be applicable after the 1999 World Radiocommunication Conference. Radiodetermination (Radar) system spurious emission dB attenuation shall be determined for radiated emission levels, not at the antenna transmission line. The measurement methods for determining the radiated spurious emission levels from the radar systems should be guided by Recommendation ITU-R M.1177.~~

¹⁵ In some cases of digital modulation (including digital broadcasting), broadband systems, pulsed modulation and narrow-band high-power transmitters for all categories of services, there may be difficulties in meeting limits close to $\pm 250\%$ of the necessary bandwidth.

IAP/14/7

ADD

¹⁶ Amateur earth stations operating below 30 MHz are in the service category ‘Amateur services operating below 30 MHz (including with SSB).’

IAP/14/8

ADD

¹⁷ Space stations, intended to operate in deep space (defined in S1.177) are exempt from spurious emission limits.

Reasons: Recommendation No. **66 (Rev. WRC–97)** directs the ITU-R to submit a report to the next WRC with a view to finalizing the space services spurious emissions limits in Appendix **S3** of the Radio Regulations. The CITEL administrations propose to confirm the values in Table II and “clean up” the table by removing the “design objectives” designation from the space services spurious emissions limits. Furthermore, by clarifying the exemption of radar systems from the Section I limits, the CITEL administrations propose to correct an oversight in Appendix **S3** regarding limits for the radiodetermination service that may lead incorrectly to the application of the Section I limits to radars. Also, the CITEL administrations propose to clarify the application of the e.i.r.p. measurement method to radars particularly, but also to other systems where antenna line measurements may not be appropriate.

WRC-2000 Agenda Item 1.4

To consider issues concerning allocations and regulatory aspects related to Resolutions 126 (WRC-97), 128 (WRC-97), 129 (WRC-97), 133 (WRC-97), 134 (WRC-97) and 726 (WRC-97);

Proposal for the Confirmation of the Fixed Service Allocation in the 31.8 – 33.4 GHz Frequency Range
(Resolution 126 and 726)

Background Information: Resolutions 126 and 726 invite the ITU-R to address, among other issues, sharing between High Density Fixed Systems (HDFS) and other radiocommunication services sharing spectrum in the bands 31.8 - 33.4 GHz, 51.4 - 52.6 GHz, 55.78 - 59 GHz and 64 - 66 GHz bands.

At WRC-97, a number of frequency bands above 30 GHz were identified through Resolution 726 as available for the deployment of high density fixed systems. Included in Resolution 726 is the frequency range 31.8 - 33.4 GHz. WRC-97 amended the table of frequency allocations to include the fixed service on a primary basis in the 31.8 - 33.4 GHz range subject to conditions found in Resolution 126. The first condition stipulated that this allocation to the fixed service would not go into force until January 1, 2001. Secondly, this allocation would be reviewed at WRC-2000 taking into account the results of sharing studies and the future requirements of the other allocated services. The frequency range 31.8 - 33.4 GHz has also has primary allocations to the radionavigation, space research (space-to-Earth) (deep space) and the inter-satellite services.

The ITU-R, through various working parties, have studied the sharing potential between the fixed service (high density applications) and the other primary services. With regard to sharing between the fixed and radionavigation service, studies indicated that sharing may be possible through the use of appropriate mitigation and operational measures, recognizing that fixed systems may receive emissions from airborne radionavigation systems. However, actual interference events are expected to be rare. The CPM Report recommended that sharing between the fixed and radionavigation service could be addressed through the development of appropriate ITU-R Recommendations. Sharing between the fixed service and the deep space facilities is considered practical as there are only a few deep space sites in the world and coordination with the fixed stations is feasible. It would be appropriate to adopt a suitable free-space spectral pfd limit at the surface of the Earth in order to provide adequate protection to HDFS systems from BSS satellites in a temporary near-Earth orbit phase. Studies have also concluded that interference levels from high density fixed stations into inter-satellite receivers are well within acceptable limits.

Proposal(s):

**IAP/14/9
MOD**

29.9 – 34.2 GHz

<u>ALLOCATION TO SERVICES</u>		
Region 1	Region 2	Region 3
31.8 – 32	FIXED S5.547A MOD S5.547A RADIONAVIGATION SPACE RESEARCH (deep space) (space-to-Earth) MOD S5.547 S5.547B S5.548	
32 – 32.3	FIXED S5.547A MOD S5.547A INTER-SATELLITE RADIONAVIGATION SPACE RESEARCH (deep space) (space-to-Earth) MOD S5.547 S5.547C S5.548	
32.3 – 33	FIXED S5.547A MOD S5.547A INTER-SATELLITE RADIONAVIGATION MOD S5.547 S5.547D S5.548	
33 – 33.4	FIXED S5.547A MOD S5.547A RADIONAVIGATION MOD S5.547 S5.547E	

**IAP/14/10
SUP**

Suppress Resolution 726

~~RESOLUTION 726 (WRC 97)~~

~~Frequency bands above 30 GHz available for high-density applications in the fixed service~~

**IAP/14/11
MOD**

S5.547 The bands 31.8 – 33.4 GHz, 51.4 – 52.6 GHz, 55.78 – 59 GHz and 64 – 66 GHz are available for high-density applications in the fixed service (~~see Resolution 726 (WRC 97)~~).

**IAP/14/12
SUP**

Suppression of Resolution 126

~~RESOLUTION 126 (WRC 97)~~

~~Use of the frequency band 31.8 – 33.4 GHz for high-density systems in the fixed service~~

**IAP/14/13
MOD**

S5.547A ~~Use of the band 31.8 – 33.4 GHz by the fixed service shall be in accordance with Resolution 126 (WRC 97).~~ Due to the operational nature of the radionavigation service, systems in the fixed service operating in the 31.8 – 33.4 GHz band may be subject to emissions from airborne radionavigation systems. Interference into fixed systems is expected to be rare, however, Administrations are encouraged to take practical measures to minimize potential interference, taking into account S4.10.

Table S21-4

Frequency Band	Service	Limit in dB (W/m ²) for angle of arrival (δ) above the horizontal plane			Reference bandwidth
		0 - 5	5 - 25	25 - 90	
<u>31.8 – 32.3 GHz</u>	SRS	<u>-120</u>	<u>-120+0.75(δ - 5)</u>	<u>-105</u>	1 MHz
<u>32 – 33 GHz</u>	ISS	<u>-135</u>	<u>-135 + (δ - 5)</u>	<u>-115</u>	<u>1 MHz</u>

Reasons: Sharing studies have concluded that reasonable measures can be taken by the various services using this band to ensure practical co-existence. As a result, it is possible to confirm the fixed allocations in the band 31.8 - 33.4 GHz, and to identify this band as being available for HDFS applications. Consequently, Resolution **126** can be suppressed. In addition, the draft CPM Report to WRC-2000 provides suitable pfd limits to protect the fixed service. With regard to the band 31.8 – 33.4 GHz, Resolution **726** can be suppressed since the necessary ITU-R studies required to confirm the fixed service allocation have been completed.

WRC-2000 Agenda Item 1.6.2

Identification of a global radio control channel to facilitate multimode terminal operation and worldwide roaming of IMT-2000

Background Information: At the time that the WRC-2000 agenda was established, studies were underway within TG 8/1 examining whether global roaming could be accomplished by identifying one or more global radio control channels that could allow radios to be tuned to the appropriate frequency band identifying a “physical” channel was wanted, in favor of using other approaches that may include the development of a “logical” channel structure for this purpose.

Based on discussions to date within TG 8/1, it has been determined that facilitation of multimode terminal operation and worldwide roaming of IMT-2000 is possible without a specific physical global radio control channel.

Proposal(s):

IAP/14/ 15

There is no need to identify a global radio control channel for IMT-2000 in the Radio Regulations, therefore no action is required by WRC-2000.

WRC-2000 Agenda Item 1.7

Review of the use of the HF bands by the aeronautical mobile (R) and maritime mobile services with a view to protecting operational, distress and safety communications, taking into account Resolution 346 (WRC-97)

Proposal to protect the operational, distress and safety communications in the HF bands used by the aeronautical mobile (R) and maritime mobile services

Background Information: WP8B and the CPM have identified two issues comprising this agenda item;

- 1) HF bands allocated for the distress and safety communications of the maritime and aeronautical mobile (R) services have been subjected to an increase in harmful interference caused by unauthorized use. It is essential for the safety-of-life and property that these distress and safety channels are kept free from unauthorized use and harmful interference.
- 2) Several maritime HF distress and safety frequencies are also used for international routine calling. The routine calling can cause interference to distress and safety communications due to the caller not being aware of ongoing traffic on the ship calling frequency since the ship is tuned to a different receive frequency for coast station calls and replies.

In addition, both the CPM Report and the report of the SCRPM to the CPM address the issue of interference in the HF bands by providing possible methods with satisfying this agenda item. One method proposes the modification of Resolution 207, where administrations would be drawn towards the fact that the interference is often due to unauthorized sources and to study solutions in assisting the mitigation of this interference. Another method calls upon the ITU-R to study the future technical and operational needs of the maritime mobile and aeronautical mobile (R) services in particular solutions providing effective and efficient distress and safety communications. Therefore, CITEL administrations propose the modification of Resolution 207 and the addition of new Resolution [HF].

MARITIME ISSUES

The protection of maritime HF distress and safety frequencies, in particular the frequencies 12 290 kHz and 16 420 kHz, is addressed in Resolution **346 (WRC-97)**. A significant source of interference to distress traffic on these frequencies is due to their use as calling frequencies. Resolution **346** calls for administrations to minimize the use of these frequencies for non-safety calling purposes by coast and ship stations.

GMDSS distress and safety frequencies are also used for calling in some of the other maritime HF bands. In each maritime HF band one channel is designated as an international calling channel pair for radiotelephony. In the 4, 6, 12 and 16 MHz bands, the distress and safety frequency is the same as the ships transmitting frequency on the calling channel.

The radio telephony calling channels are used on duplex basis, whilst the distress and safety frequencies are used on simplex. When a ship is calling a coast station, it transmits on the distress frequency. The problem is that at times that the ship has difficulty monitoring whether or not there is ongoing distress traffic, because its receiver is on the corresponding coast station frequency. This problems occurs in the 4, 6, 12 and 16 MHz bands and not in the 8, 18, 22 and 25 MHz bands. The problem is being caused by the transmitting station not adhering to existing regulatory standards which require a station to listen on its transmitting frequency prior to transmitting. Equipment modification may be necessary in order to listen on the ship frequency of a duplex pair prior to transmitting on that frequency.

Once initial contact has been established and working frequencies coordinated, traffic handling is accomplished directly on the coordinated working frequencies.

The CPM identified that compliance with existing Radio Regulations, **S52.224** which requires that a station listens before transmitting is a method to help alleviate the interference problem. Further regulations are not required, rather enforcement of the existing regulation. CPM considered the modification of Article **S52** and Appendices **S13** and **S17** to exclude routine calling from the HF distress and safety frequencies as a method to satisfy the agenda item. This method may require modification of existing equipment.

CITEL administrations propose no change to divide the existing distress and calling channels in two separate frequencies, one exclusive distress and safety frequency and one international radiotelephony calling frequency. The distress frequencies should remain the same as they are at present where calling is allowed and no modifications to the distress procedures are required. Strict compliance and enforcement of existing Radio Regulations, **S52.224**, which requires that a station listen before it transmits would alleviate this problem. This proposal contains the minimum modifications required in the Radio Regulations and its Appendices in order to improve the situation on the HF radiotelephony distress and safety frequencies.

CPM further encouraged the use of digital selective calling (DSC) instead of calling by radiotelephony, while recognizing that all vessels may not be fitted with DSC.

This proposal is also encouraging ships and coast stations to use digital selective calling. If voice calling is required, it should in the first instance be done on the coast station working channel and secondarily on the appropriate calling frequency.

AERONAUTICAL ISSUES

The interference to HF frequencies allocated to the aeronautical mobile (R) service between 2 850 kHz and 22 000 kHz appears to be the result of unauthorized non-aviation use of aeronautical mobile (R) frequencies. In some parts of the world the aeronautical mobile (R) HF frequencies are being used for land mobile, broadcast, fixed point-to-point communications and in maritime applications such as in support of fishing fleets. These unauthorized uses have resulted in frequent cases of harmful interference and have diminished the spectrum available for the aeronautical mobile (R) safety-of-life applications.

Administrations should ensure that stations of services other than the aeronautical mobile (R) service refrain from using frequencies in the bands allocated exclusively to the aeronautical mobile (R) service. Administrations should make every effort to identify and locate the source of any unauthorized emission causing harmful interference. Recognizing that such emissions are capable of endangering human life and property and the safe and regular conduct of aircraft operations, should take necessary measures to prevent stations from operating in contravention of ITU Radio Regulations.

WP8B and the CPM recommend modifications of Article **S15** to ensure that suitable provisions are made for the aeronautical mobile (R) service.

CITEL administrations propose modifications to Article **S15** to include reference to Appendix **S27**. This modification will ensure special consideration is given to avoiding interference on the frequencies used for safety and regularity of flight. Currently, Article **S15** only refers to Article **S31** Appendix **S13**, which is primarily for maritime services.

CITEL administrations propose no changes to Appendix **S27**. Presently, the HF bands allocated to the aeronautical mobile (R) service are nearly saturated by the use of analog voice communications. This spectrum

must be maintained for the new digital high frequency data link (HFDL) communications. HFDL communications will provide a capability for the transfer of air traffic control and aeronautical operational control data to and from pilots operating over oceanic airspace, on polar routes, and in airspace over sparsely populated or undeveloped countries where other communications systems are not practical. The International Civil Aviation Organization (ICAO) will have completed Standards and Recommended Practices for HFDL before the end of 1999. Appendix **S27** contains the Allotment Plan for the aeronautical use of HF aeronautical mobile (Route) service. Review of Appendix **S27**, if necessary, should be performed by ICAO and by ITU-R Working Party 8B and consequently considered by a subsequent WRC.

Proposal(s):

ARTICLE S15

Interferences

Section I – Interference from Radio Stations

**IAP/14/ 16
MOD** **S15.8 § 4** Special consideration shall be given to avoiding interference on distress and safety frequencies and those related to distress and safety identified in Appendix **S13** and safety and regularity of flight identified in Appendix **S27**,

Reasons: Frequencies for safety and regulatory of flight in the Aeronautical Mobile (R) service are not listed in Appendix **S13**, since this appendix is primarily for maritime services. Inclusion of Appendix **S27** in this provision will ensure special consideration is given to avoiding interference on these frequencies used for safety and regularity of flight.

Section VI – Procedure in a case of harmful interference

**IAP/14 / 17
MOD** **S15.28 § 20** Recognizing that transmissions on the distress and safety frequencies and frequencies used for the safety and regularity of flight (See Article **S31**, and Appendix **S13** and Appendix **S27**) require absolute international protection, and that the elimination of harmful interference to such transmissions is imperative, administrations undertake to act immediately when their attention is drawn to any such harmful interference.

Reasons: Frequencies for safety and regulatory of flight in the Aeronautical Mobile (R) service are not listed in Article **S31** or Appendix **S13**, since this appendix is primarily for maritime services. Inclusion of Appendix **S27** would lead to the protection of frequencies used for safety and regularity of flight against interference.

**IAP/14/ 18
MOD** **S15.35 § 27** On being informed that a station over which it has jurisdiction is believed to have been the cause of harmful interference, an administration shall, as soon as possible, acknowledge receipt of that information by ~~telegram~~ the quickest means available. Such acknowledgement shall not constitute an acceptance of responsibility.

Reasons: Improvements in technology provide quicker means of communicating information, such email and facsimiles. The quicker a case of interference is reported, the quicker the action can be taken against that interference, and the shorter the duration of the interference.

ARTICLE S52
Special rules relating to the use of frequencies

IAP/14/ 19 NOC	S52.216 <i>C. Bands between 4 000 kHz and 27 500 kHz</i> C1. Mode of operation of Stations
IAP/14/ 20 MOD	S52.219 3) Coast stations employing class J3E or J2D emissions in accordance with No. S52.217 in the bands between 4 000 and 27 500 kHz shall use the minimum power necessary to cover their service area and shall at no time use a peak envelope power in excess of 10 kW per channel. <u>On the radiotelephony calling frequencies 4 417 kHz and 6 516 kHz coast stations shall limit their peak envelope power to the lowest value to maintain reliable communications, not to exceed 5 kW.</u> Reasons: Due to geographical differences, the higher power of 5 kW is required to provide adequate communications coverage.
IAP/14/ 21 <u>NOC</u>	S52.220 4) Ship stations employing class J3E or J2D emissions in accordance with No. S52.217 in the bands between 4 000 kHz and 27 500 kHz shall at no time use a peak envelope power in excess of 1.5 kW per channel. Reasons: Higher shipboard power increases the potential for interference and out of band emissions.
IAP/14/ 22 ADD	S52.220A <u>Administrations should encourage the coast stations and ships under their jurisdiction to utilize the digital selective calling techniques for call and reply.</u> Reasons: Decreases the potential for interference on the distress channels.
IAP/14/ 23 ADD	S52.220B <u>When calling by radiotelephony is necessary, it should be done (in order of preference):</u> Reasons: Decreases the potential for interference on the distress channels.
IAP/14/ 24 ADD	S52.220C (1) <u>On the working frequencies assigned to the coast station in question or</u> Reasons: Decreases the potential for interference on the distress channels.
IAP/14/ 25 ADD	S52.220D (2) <u>when this is not possible, on the international calling frequencies listed under S52.221.</u> Reasons: Decreases the potential for interference on the distress channels

C2. Call and reply

IAP/14/ 26

NOC

S52.221 § 97. (1) Ship stations may use the following carrier frequencies for calling in radiotelephony:

4 125 kHz^{3,4,5}
6 215 kHz^{4,5}
8 255 kHz
12290 kHz⁵
16420 kHz⁵
18795 kHz
22 060 kHz
25 097 kHz

Reasons: It is not necessary to convert calling frequencies from duplex to simplex.

IAP/14/ 27

NOC

³ **S52.221.1** In the United States, the carrier frequency 4 125 kHz is also authorized for common use by coast and ship stations for single-sideband radiotelephony on a simplex basis, provided the peak envelope power of such stations does not exceed 1 kW (see also No. **S5.222.2**).

Reasons: This note supports existing U.S. use of this channel in remote areas of our Search and Rescue areas of responsibility and supports communications in remote areas.

IAP/14/ 28

NOC

⁴ **S52.221.2** The carrier frequencies 4 125 kHz and 6 215 kHz are also authorized for common use by coast and ship stations for single-sideband radiotelephony on a simplex basis for call and reply purposes, provided that the peak envelope power of such stations does not exceed 1 kW. The use of these frequencies for working purposes is not permitted (see also Appendix **S13** and No. **S52.221.1**).

Reasons: This note supports existing use of this channel in remote areas of Search and Rescue responsibility and supports communications in remote areas.

IAP/14/ 29

NOC

⁵ **S52.221.3** The carrier frequencies 4 125 kHz, 6 215 kHz, 8 291 kHz, 12 290 kHz and 16 420 kHz are also authorized for common use by coast and ship stations for single-sideband radiotelephony on a simplex basis for distress and safety traffic.

Reasons: This note supports existing uses and enhances maritime safety in remote geographical areas.

IAP/14/ 30

NOC

S52.222 (2)⁶ Coast stations may use the following carrier frequencies for calling in radiotelephony:

4417kHz⁷
6516kHz⁷
8779kHz
13137kHz
17302kHz
19770kHz
22756kHz
26 172 kHz

Reasons: Conversion to simplex operation is not necessary.

IAP/14/ 31

SUP

⁶ ~~S52.222.1~~ These frequencies may also be used by coast stations with class H2B emission, when using the selective calling system defined in Recommendation ITU-R M.257-3.

Reasons: This system is out of date and no longer in use.

IAP/14/ 32

MOD

⁷ S52.222.2 The carrier frequencies 4 417 kHz and 6 516 kHz are also authorized for common use by coast and ship stations for single-sideband radiotelephony on a simplex basis, provided that the peak envelope power of such stations ~~does not exceed 1 kW~~ shall be limited to the lowest value to maintain reliable communications, not to exceed 5 kW. The use of 6 516 kHz for this purpose should be limited to daytime operation (see also No. S52.221.1).

Reasons: Consequential to MOD S52.219.

IAP/14/ 33

NOC

S52.224 § 99. 1) Before transmitting on the carrier frequencies 4 125 kHz, 6 215 kHz, 8 291 kHz, 12 290 kHz or 16 420 kHz a station shall listen on the frequency for a reasonable period to make sure that no distress traffic is being sent (see Recommendation ITU-R M.1171).

Reasons: It may not be a simple task to monitor the ship transmit frequency when set to a duplex calling channel.

IAP/14/ 34

MOD

S52.227 2) The frequencies to be used for the conduct of simplex radiotelephony are shown in Appendix S17, Sub-Section B. In these cases, the peak envelope power of the coast station transmitter shall not exceed 1 kW.

Reasons: Editorial.

APPENDIX S17

Frequencies and channeling arrangements in the high-frequency bands for the maritime mobile service

(See Article S52)

IAP/14/ 35

NOC

PART A – Table of subdivided bands

PART B – Channeling arrangements Section I – Radiotelephony

IAP/14/ 36

NOC

5. The following frequencies in Sub-Section A are allocated for calling purposes:
- (Channel No. 421 in the 4 MHz band);
 - (Channel No. 606 in the 6 MHz band);
 - (Channel No. 821 in the 8 MHz band);

- (Channel No. 1221 in the 12 MHz band);
- (Channel No. 1621 in the 16 MHz band);
- (Channel No. 1806 in the 18 MHz band);
- (Channel No. 2221 in the 22 MHz band);
- (Channel No. 2510 in the 25 MHz band).

The remaining frequencies in Sub-Sections A, B, C-1 and C-2 are working frequencies.

Reasons: Conversion to simplex operation is not necessary.

IAP/14/ 37

NOC

5A For the use of the carrier frequencies:

- 4 125 kHz (Channel No. 421)
- 6 215 kHz (Channel No. 606)
- 8 291 kHz (Channel No. 833)
- 12 290 kHz (Channel No. 1221)
- 16 420 kHz (Channel No. 1621)

In Sub-Section A, by coast and ship stations for distress and safety purposes, see Article **S31** and Appendix **S13**.

Reasons: Conversion to simplex operation is not necessary.

SUB-SECTION A

IAP/14/ 38

NOC

Table of single-sideband transmitting frequencies (kHz) for duplex (two-frequency) operation

Reasons: Conversion to simplex operation is not necessary.

IAP/14 / 39

NOC

APPENDIX S27

Frequency allotment Plan for the aeronautical mobile (R) service and related information

Reasons: ICAO in consultation with the ITU-R should perform any review of Appendix **S27**, if necessary. The HF bands allocated to the aeronautical mobile (R) service are nearly saturated by the use of analog voice communications. This spectrum must be maintained for the new digital high frequency data link (HFDDL) communications. The world-wide implementation of HFDDL communications will reduce the burden on voice communications between pilots and controllers by using the data link for routine communications and freeing voice communications for more critical communications.

MOD

Unauthorized use of frequencies in the bands allocated to the maritime mobile service and to the aeronautical mobile (R) service

The World Administrative Radiocommunication Conference for the Mobile Services, Geneva, 1987, (Istanbul, 2000),

considering

- a) that provisions of the Radio Regulations prohibit the unauthorized use of certain frequencies for other than safety related communications;
- b) that enforcing compliance with these regulatory provisions is becoming increasingly difficult with the availability of low-cost HF SSB transceivers;
- ~~a~~c) that monitoring observations of the use of frequencies in the band 2 170-2 194 kHz and in the bands allocated exclusively to the maritime mobile service between 4 063 kHz and 27 500 kHz and to the aeronautical mobile (R) service between 2 850 kHz and 22 000 kHz show that a number of frequencies in these bands are still being used by stations of other services, some of which are operating in contravention of No. S23.2;
- ~~b~~d) that these stations are causing harmful interference to the maritime mobile and aeronautical mobile (R) services;
- ee) that HF radio is the sole means of communication in certain situations for the maritime mobile service and that certain frequencies in the bands mentioned in *considering c)* are reserved for distress and safety purposes;
- ~~d~~f) that HF radio is the sole means of communication in certain situations for the aeronautical mobile (R) service and that this is a safety service;
- g) that this Conference has reviewed the use of the HF bands by the aeronautical mobile (R) and maritime mobile services with a view to protecting the operational, distress and safety communications [and has adopted Resolution [HF] (WRC-2000) to study the future technical and operational needs for the existing distress and safety frequencies and possible solutions to provide for efficient and effective distress, safety and other communications beyond the year 2000].

considering in particular

- eh) that it is of paramount importance that the distress and safety channels of the maritime mobile service be kept free from harmful interference, since they are essential for the protection of the safety of life and property;
- fi) that it is also of paramount importance that channels directly concerned with the safe and regular conduct of aircraft operations be kept free from harmful interference, since they are essential for the safety of life and property,

resolves
to urge administrations

1 to ensure that stations of services other than the maritime mobile service abstain from using frequencies in distress and safety channels and their guard bands and in the bands allocated exclusively to that service, except under the conditions expressly specified in Nos. **S4.4**, **S5.128**, **S5.129**, **S5.137** and **S4.13** to **S4.15**; and to ensure that stations of services other than the aeronautical mobile (R) service refrain from using frequencies allocated to that service except under the conditions expressly specified in Nos. **S4.4** and **S4.13**;

2 to make every effort to identify and locate the source of any unauthorized emission capable of endangering human life or property and the safe and regular conduct of aircraft operations, and to communicate their findings to the Radiocommunication Bureau;

3 to participate in the monitoring programmes that the Radiocommunication Bureau may organize pursuant to this Resolution;

4 to make every effort to ensure that such emissions are made in appropriate bands allocated to services other than the maritime mobile service or the aeronautical (R) mobile service;

5 to request their competent authorities to take, within their respective jurisdiction, such legislative or regulatory measures which they consider necessary or appropriate in order to prevent stations from unauthorized use of distress and safety channels or operating in contravention of No. **S23.2**,

to invite the Radiocommunication Bureau

1 to study possible solutions, technical and regulatory, to assist in mitigating HF interference;

~~4~~2 to continue to organize monitoring programmes, at regular intervals, in the maritime distress and safety channels and their guard bands and in the bands allocated exclusively to the maritime mobile service between 4 063 kHz and 27 500 kHz and to the aeronautical mobile (R) service between 2 850 kHz and 22 000 kHz, with a view to ensuring the timely distribution of monitoring data and identifying the stations of other services operating on these channels or in these bands;

~~2~~3 to seek the cooperation of administrations in identifying the sources of those emissions by all available means and in securing the cessation of those emissions;

~~3~~4 when the station of another service transmitting in a band allocated to the maritime mobile service or to the aeronautical mobile (R) service has been identified, to inform the administration concerned,

to invite ITU-R and ITU-D

1 to increase regional awareness of appropriate practices to help mitigate interference in the HF bands, especially on distress and emergency channels;

2 to include the problem of interference to distress and emergency channels on agenda of regional radiocommunication and development seminars;

requests administrations

to take all necessary steps in such cases to ensure the cessation of any transmissions contravening the provisions of the Radio Regulations on the frequencies or in the bands referred to in this Resolution.

IAP/14/ 41

DRAFT RESOLUTION [HF] (WRC-2000)

ADD

Technical and operational needs for distress and safety frequencies allocated to the maritime mobile service and the aeronautical mobile (R) service

The World Radiocommunication Conference (Istanbul, 2000),

considering

- a) that the HF frequencies currently used by the aeronautical and maritime mobile services for distress, safety and other communications, including allotted operational frequencies, suffer from harmful interference and are often subject to difficult propagation conditions;
- b) that WRC-97 considered some aspects of the use of the HF bands for distress and safety communications in the context of the Global Maritime Distress and Safety System (GMDSS), especially with regard to regulatory measures;
- c) that existing regulatory measures prohibit the unauthorized use of certain frequencies for other than safety related traffic;
- d) that enforcing compliance with these regulatory measures is becoming increasingly difficult with the availability of low-cost HF SSB transceivers;
- e) that unauthorized operations using maritime and aeronautical HF frequencies are continuing to increase and are already a serious risk to HF distress, safety and other communications;
- f) that this Conference revised Resolution **207** regarding the unauthorized use of frequencies in the bands allocated to the maritime mobile service and to the aeronautical mobile (R) service;
- g) that there is a need for a review of the frequency assignments and provisions for HF distress, safety and aeronautical mobile (R) service communications;

h) that some administrations have resorted to the use of transmitting warning messages on operational HF channels as a means of deterring unauthorized users,

resolves to invite ITU-R

1 to study the future technical and operational needs for the existing HF operational, distress and safety frequencies and possible solutions to provide for efficient and effective operational, distress and safety communications in the maritime mobile and aeronautical mobile (R) services beyond the year 2000;

2 to report the results of the studies referred to in *resolves* 1 to WRC-2003,

further resolves

1 to urge all administrations and concerned organizations, including IMO and ICAO, to actively participate and contribute to the ITU-R studies;

2 to urge administrations to take all practicable steps to comply with Resolution **207 (Rev.WRC-2000)**.

instructs the Secretary-General

to communicate this Resolution to the attention of the International Maritime Organization and the International Civil Aviation Organization.

WRC-2000 Agenda Item 1.8

To consider regulatory and technical provisions to enable earth stations located on board vessels to operate in the fixed-satellite service (FSS) networks in the bands 3 700 - 4 200 MHz and 5 925 - 6 425 MHz, including their coordination with other services allocated in these bands;

Proposal for communications by earth stations on board vessels using frequencies allocated to the fixed-satellite service and used by existing space segment in the fixed-satellite service

Background Information: This item concerns provision of communications by earth stations on board vessels (ESVs) using frequencies allocated to the fixed-satellite service and used by existing space segment in the fixed-satellite service. These stations operate in three distinct modes: at sea; while stationary in or near port; and in motion approaching or departing from port.

Operations at sea (beyond a certain distance for near-shore coordination) by ESVs in the fixed-satellite service do not present a potential for interference to stations in the fixed service operating in accordance with the 6 GHz FS allocation, and therefore need not be coordinated. Operations while these earth stations are stationary at pre-determined points can be coordinated bilaterally with fixed service systems. Technical and regulatory issues concern the potential for interference between in-motion operations by these ESVs operating close to shore and stations in the fixed service both on and offshore.

The studies that have been conducted in ITU-R have illustrated that the values for the minimum distance are principally affected by the interference criteria required to protect the fixed service and the number of passages per unit time by vessels equipped with earth stations. Based on different values for these assumptions, the results of these preliminary studies yielded a range of values for the minimum distance from 100 km to 540 km. It should be noted that studies submitted to the CPM by some administrations suggested values for the minimum distance of 150 km to 370 km. Upon further review CITEL Administrations are of the opinion that 200 km is sufficiently conservative to protect the fixed service systems operating in the same band from interference.

Proposal(s):

IAP/14/ 42

MOD

3 700 - 4 200 MHz

Allocation to services		
Region 1	Region 2	Region 3
3 700-4 200 FIXED FIXED-SATELLITE (space-to-Earth) ADD S5.ESV Mobile	3700-4200 FIXED FIXED-SATELLITE (space-to-Earth) ADD S5.ESV MOBILE except aeronautical mobile	

Reasons: To establish regulatory and technical provisions for operations of earth stations on board vessels in the fixed-satellite service.

IAP/14/ 43

MOD

5 925 - 6 425 MHz

Allocation to services		
Region 1	Region 2	Region 3
5925-6425	FIXED FIXED-SATELLITE (Earth-to-space) ADD S5.ESV MOBILE S5.149 S5.440 S5.458	

Reasons: To establish regulatory and technical provisions for operations of earth stations on board vessels in the fixed-satellite service

IAP/14/ 44

ADD

S5.ESV In the frequency bands 3 700-4 200 MHz and 5 925-6 425 MHz, transponders on space stations in the fixed-satellite service may be used, additionally, by earth stations on vessels. Such use is subject to the provisions specified in the procedures of Resolution **ZZZ. (WRC-2000)**.

Reasons: To establish regulatory and technical provisions for operations of earth stations on board vessels in the fixed-satellite service and protection for terrestrial stations operating in the FS in the same band.

Provisions to enable earth stations located on board vessels to operate in fixed-satellite service networks in the bands 3 700-4 200 MHz and 5 925-6 425 MHz

The World Radiocommunication Conference (Istanbul, 2000),

considering

- a) that there is a demand for global wideband satellite communication services on vessels;
- b) that the technology exists that would permit the use of fixed-satellite services (FSS) networks by earth stations on board vessels (ESVs) operating in the 3 700-4 200 and 5 925-6 425 MHz bands;
- c) that ESVs have the potential to cause unacceptable interference to the fixed service (FS) systems in the band 5 925-6 425 MHz;
- d) that FS systems have the potential to cause interference to ESVs in the 3 700-4 200 MHz band;
- e) that ESVs operating in these bands require considerably less than the full bandwidth in this FSS allocation and only a portion of the visible geostationary arc;
- f) that there are a limited number of geostationary FSS systems that have global coverage;
- g) that in order to ensure the protection and future growth of the FS, the ESV must operate with certain technical and operational constraints;
- h) that administrations may authorize radiocommunication stations on off-shore structures and platforms for which they are responsible;
- i) that based on appropriate assumptions a minimum distance can be calculated beyond which the ESV will not have the potential to cause unacceptable interference to the fixed service in this band,

noting

- a) that operation within the territorial sea is at the discretion of the administration with territorial authority, in which case the relevant procedures of that administration will apply;
- b) that operation of earth stations on vessels from specified fixed points at locations outside the territorial sea but for which an administration has territorial jurisdiction is fully within the FSS,

resolves

- 1 that the administration that issues the radio licence for the use of ESVs in these bands (licensing administration) shall ensure that such stations do not cause unacceptable interference to stations in the fixed service;
- 2 that licensing administrations shall ensure that ESVs are capable of operating in compliance with the requirements of this Resolution;
- 3 that operators of ESVs shall comply with the conditions listed in the Annex to this Resolution and as may be established by the licensing administration(s);

- 4 that ESVs shall not claim protection from fixed service station transmissions;
- 5 that on a provisional basis any transmissions from ESVs within a distance of 200 km off any given coast shall be based upon the prior agreement of that coastal administration;
- 6 that ESV operators shall provide any assistance necessary to the coastal administration in order to facilitate the agreement;
- 7 that the ESV system shall include means of identification and automatic mechanisms to terminate transmissions whenever the station operates outside its pre-authorized geographic (see *resolves* 5) or operational limits;
- 8 that ESVs shall be equipped so as to enable the licensing administration under the provisions of Article **S18** to verify earth station performance and to accomplish the switch off of the ESV transmission immediately upon request by an administration whose services may be affected;
- 9 that when ESVs operating beyond the territorial sea but within 200 km of the coast of an administration fail to comply with the terms required by that administration pursuant to *resolves* 3 and 5, then that administration may:
 - request the ESV to comply with such terms or cease operation immediately; or
 - request the licensing administration to require such compliance or immediate cessation of the operation;
- 10 that any licensing authority that licenses ESVs shall agree to maintain at all times a point of contact, which shall be published in a circular of the ITU, that may be contacted by an affected administration seeking assistance pursuant to *resolves* 3 and 5 above.

invites the ITU-R as a matter of urgency

- 1 to continue its studies to determine the optimum technical and operational constraints to be applied to ESV operations and, in particular, to determine the minimum operational distance from the coast of an administration beyond which ESVs are assumed not to have the potential to cause unacceptable interference to fixed service stations of that administration;
- 2 to develop recommendations on methods for coordination between terrestrial stations and ESVs while in motion at less than the minimum distance specified in *resolves* 5;
- 3 to report on the results of these studies to the Conference Preparatory Meeting for WRC-[2003],

urges administrations

to participate actively in the aforementioned studies by submitting contributions to the ITU-R,

requests

WRC-[2003] to take appropriate action based on those studies.

ANNEX TO RESOLUTION ZZZ (WRC-2000)

Provisional Technical Constraints Applicable to ESVs operating the bands 3 700-4 200 MHz and 5 925-6 425 MHz

Minimum diameter of ESV antenna:	2.4 m
Maximum half-power beamwidth of ESV antenna	1.5 degrees
Minimum elevation angle of ESV antenna:	10°
Maximum necessary bandwidth per vessel:	2.346 MHz
Maximum necessary bandwidth in a single operating area:	36 MHz
Maximum ESV transmitter power spectral density at the input to the antenna:	17 dB (W/MHz)
Tracking accuracy of ESV antenna	0.2 degrees

Reasons: To establish regulatory and operational provisions for ESV operations in the fixed-satellite service and to avoid the uncontrolled deployment of, and communications by ESVs and ensure the protection of the fixed service.

WRC-2000 Agenda Item 1.9

To take into account the results of ITU-R studies in evaluating the feasibility of an allocation in the space-to-Earth direction to the mobile-satellite service in a portion of the 1 559 - 1 567 MHz frequency range, in response to Resolutions 213 and 220 (WRC-97)

Background Information: Proposals were made to WRC-97 to reallocate portions of the 1 559 - 1 610 MHz band which, with the exception of a fixed service allocation in some countries, currently is exclusively allocated to the radionavigation satellite service and aeronautical radionavigation service worldwide. Other proposals were made not to change the existing allocations in these bands. In Resolution **220 (WRC-97)**, the ITU-R was requested to study, as a matter of urgency, the technical criteria and operational and safety requirements to determine if sharing between the aeronautical radionavigation and radionavigation-satellite services, operating or planned to be operate, in the band 1 559-1 610 MHz, and the mobile-satellite service in a portion of the 1 559-1 567 MHz frequency range, is feasible, taking into account the essential need to protect systems operating in the aeronautical radionavigation and radionavigation-satellite services in the band 1 559-1 610 MHz.

There are millions of RNSS receivers in use today for a wide range of applications, including safety-of-life-critical navigation on land, at sea, and in the air. Today, most of these receivers operate with the Global Positioning System (GPS), an important element of the Global Navigation Satellite System (GNSS) that operates in the 1 559 - 1 610 MHz band.

GPS provides position and time information to users by means of one-way transmissions using RNSS (space-to-Earth) allocations. GPS is information technology that uses systems of hardware and software, as well as information (time and ephemeris) transmitted from satellites to provide derived information to the user.

GLONASS and GPS are established elements of the International Civil Aviation Organization (ICAO) GNSS, operating in the band 1 559 - 1 610 MHz. These systems are accepted by the ICAO Council for use in international civil aviation. ICAO is currently developing Standards and Recommended Practices for international application in civil aviation. The GNSS will be used during all phases of flight, including precision approaches and landing, and under all weather conditions. The latter places extensive requirements on the performance characteristics of the system. The aeronautical use of RNSS is recognized in the Radio Regulations as a safety-of-life application. GPS is the sole basis for the formation of International Atomic Time and Coordinated Universal Time (UTC) by the International Bureau of Weights and Measures. GPS is also the primary means by which clocks are synchronized within telecommunications networks for Time Division Multiple Access transmissions. Time and frequency functions are or will be available on other RNSS systems.

As Resolution **220 (WRC-97)** recognizes RNSS and ARNS systems are evolutionary and other types of GNSS are under development for operation in the band 1 559 - 1 610 MHz. There are both aeronautical and non-aeronautical safety-of-life services in the 1 559 - 1 610 MHz band, and it is well established that there is an essential need to protect systems operating in the ARNS and RNSS.

The core signal structures of the MSS and the RNSS and ARNS are fundamentally different: MSS uses a two-way signal while ARNS and RNSS transmits a weak, receive-only signal. Having systems from a radiocommunication service operate on a co-primary, co-frequency basis in the 1 559 - 1 610 MHz band would limit ARNS and RNSS operators' flexibility to adjust their spectrum usage, and would hamper

efforts to develop a GNSS that is capable of meeting evolving international needs and of providing adequate protection for international civil use worldwide.

Studies undertaken in the ITU addressed current aeronautical radionavigation and radionavigation-satellite service systems, as well as future radionavigation services planned for this band.

These studies reached the following conclusions:

- MSS (space-to-Earth) and ARNS/RNSS are fundamentally incompatible in any portion of the 1 559-1 567 MHz band. Not only do MSS signals disrupt ARNS/RNSS, but GNSS pseudolites disrupt MSS signals.
- The -112 dB(W/m²/MHz) power flux-density level at the Earth's surface that is mentioned in Resolution 220 clearly would not protect existing RNSS systems (such as GPS) from harmful interference.
- The RNSS is extensively used, and is continuing to undergo a tremendous expansion which drives further evolution. These factors, along with the many critical timing, positioning, and navigation uses of RNSS sharing of the 1 559-1 610 MHz band, weigh conclusively against sharing any portion of the band segment at 1 559-1 567 MHz with any co-frequency communication service.
- The use of pseudolites in the ARNS/RNSS bands at 1 559-1 567 MHz is in its early stages, but is expected to increase in terms of numbers, geographic scope, and complete utilization of the frequency band in the near future. This use is incompatible with co-frequency MSS (space-to-Earth).

Proposal(s):

IAP/14/46

NOC

CITEL Administrations propose that no allocation be made to the Mobile Satellite Service (space-to-Earth) in any portion of the 1559 - 1567 MHz band under agenda item 1.9.

Reasons: The current allocation, 1 559 - 1 610 MHz, is required for radionavigation services, including critical aeronautical safety applications, on a worldwide basis. Based on studies conducted in the ITU-R pursuant to Resolution **220**, sharing in this band with communications services such as the mobile-satellite service (space-to-Earth) is not possible.

IAP/14/47

SUP

~~RESOLUTION 220 (WRC-97)~~

~~**Studies to consider the feasibility of use of a portion of the band 1559-1610 MHz by the mobile-satellite service (space-to-Earth)**~~

Reasons: Studies performed by the ITU-R show that co-frequency sharing between the mobile-satellite service and the radionavigation-satellite and aeronautical radionavigation services within the band 1559 - 1567 MHz is not feasible. The ITU-R studies satisfy the requirement of Resolution **220 (WRC-97)**. As a result, Resolution **220** should be suppressed.

WRC-2000 Agenda Item 1.12

To consider progress of studies on sharing between feederlinks of non-geostationary satellite networks in the mobile satellite service and geostationary-satellite networks in the fixed satellite service in the bands 19.3-19.7 GHz and 29.1-29.5 GHz, taking into account Resolution 121 (Rev.WRC-97)

Proposal for the modification of S5.541A and the suppression of Resolution 121

Background Information: Resolution **121** requests that the ITU-R conduct a study of sharing possibilities between GSO FSS and NGSO MSS feederlinks in the bands. In response ITU-R WP-4A of Study Group 4 has agreed a Draft New Recommendation, “Mitigation Techniques to Facilitate Coordination in the 20/30 GHz NGSO MSS Feederlinks”.

The Recommendation includes the topics of Adaptive Power Control, High Gain Antennas, Geographic Isolation, Site Diversity and Link Balancing.

This Recommendation is considered to have covered the requirements of Resolution **121 (Rev. WRC-97)** and thus satisfies the agenda.

Proposal(s):

**IAP/14/48
MOD**

S5.541A Feeder links of non-geostationary networks in the mobile-satellite service and geostationary networks in the fixed-satellite service operating in the band 29.1-29.5 GHz (Earth-to-space) shall employ uplink adaptive power control or other methods of fade compensation, such that the earth station transmissions shall be conducted at the power level required to meet the desired link performance while reducing the level of mutual interference between both networks. These methods shall apply to networks for which Appendix **S4** coordination information is considered as having been received by the Bureau after 17 May 1996 and until they are changed by a future competent world radiocommunication conference. Administrations submitting Appendix **S4** information for coordination before this date are encouraged to utilize these techniques to the extent practicable. ~~These methods are also subject to review by ITU-R (see Resolution **121 (Rev.WRC-97))**.~~

Reasons: The objective of Resolution **121** has been addressed through the development of a Draft New Recommendation in Study Group 4 of the ITU-R.

IAP/14/49

SUP

~~RESOLUTION 121 (Rev.WRC-97)~~

~~Continued development of interference criteria and methodologies for fixed-satellite
service coordination between feeder links of non-geostationary satellite networks in
the mobile-satellite service and geostationary satellite networks in the fixed-satellite
service in the bands 19.3-19.7 GHz
and 29.1-29.5 GHz~~

Reasons: The objectives of Resolution **121** have been met.

WRC-2000 Agenda Item 1.14

To review the results of the studies on the feasibility of implementing non-GSO MSS feeder links in the 15.43-15.63 GHz in accordance with Resolution 123 (WRC-97).

Remove the 15.43-15.63 GHz space-to-Earth allocation from the Tables of Article RR S5

Background Information: Studies conducted subject to Resolution **123 (WRC-97)** dealt with two aspects

1. Need for the allocation to non-GSO MSS feeder links in the band 15.43-15.63 GHz (space-to-Earth);
2. feasibility of implementing non-GSO MSS feeder links in the band 15.43-15.63 GHz (space-to-Earth) regarding protection of RAS, EESS (passive) and SRS (passive) operating in the band 15.35-15.4 GHz.

The ITU-R studies concluded that the space-to-Earth operation of non-GSO MSS feeder links in parts of the 15.43-15.63 band is significantly difficult and sometimes impossible, due to technical limitations that would have to be imposed on the feeder links.

The ITU-R studies complied with the Res. **123 (WRC-97)** provisions completely and hence covered all issues related to Agenda item 1.14. Taking into account that Res. **123 (WRC-97)** has attained its objectives and aims, it would be appropriate to suppress it.

The results of the studies, as reported in the CPM report, showed that it should be feasible to implement the existing non-GSO MSS feeder downlinks in the band 15.43-15.63 GHz taking into account the protection requirements for RAS and other passive services in this band. Providing that the existing non-GSO MSS feeder downlinks systems planning to use this band can provide the required protection to the passive services, the ITU-R studies did not identify any additional technical or operational disadvantages with respect to the existing systems.

The CPM report also concludes that, for future non-GSO MSS systems using the space-to-Earth allocation at 15.43-15.63 GHz substantial mitigation techniques would be required to adequately protect the RAS from harmful interference.

The technical studies also concluded that, because of high levels of suppression of out-of-band emissions required, use of the band 15.43-15.63 GHz for space-to-Earth feeder links should not extend beyond non-GSO MSS satellite networks for which advanced publication information has been received by the Bureau prior to WRC-2000.

Common CITELE proposals were developed to reflect this point of views.

IAP/14/50
MOD

GHz		
Allocation to services		
Region 1	Region 2	Region 3
15.43 – 15. 63 FIXED SATELLITE (space-to-Earth) (Earth-to-space) MOD S5.511A AERONAUTICAL RADIONAVIGATION S5.511C		

IAP/14/51
SUP

Suppress Resolution 123

~~RESOLUTION 123 (WRC-97)~~

~~Feasibility of implementing feeder links of non-geostationary satellite networks in the mobile-satellite service in the band 15.43 – 15.63 GHz (space-to-earth) while taking into account the protection of the radio astronomy service, the earth exploration-satellite (passive) service and the space research (passive) service in the band 15.35 – 15.4 GHz~~

IAP/14/52
MOD

Modify **S5.511A** as follows:

S5.511A Use of the band 15.43-15.63 GHz by the fixed satellite service (~~space-to-Earth (see Resolution 123 (WRC-97)) and Earth-to-space~~) is limited to feeder links of non-geostationary systems in the mobile-satellite service, subject to coordination under No. **S911A**. In the space-to-Earth direction, the use of this band is limited to feeder links of non-GSO MSS systems for which advanced publication information has been received prior to WRC-2000 the minimum earth station elevation angle above and gain towards the local horizontal plane and the minimum coordination distances to protect an earth station from harmful interference shall be in accordance with Recommendation ITU-R S.1341. Also in the space-to-Earth direction, harmful interference shall not be caused to stations of the radio astronomy service using the band 15.35-15.4 GHz. The threshold levels of interference and associated power flux-density limits, which are detrimental to the radio astronomy service, are given in Recommendation ITU-R RA.769-1 for 98% of the time. Special measures will need to be employed to protect the radio astronomy service in the band 15.35-15.4 GHz. ~~(WRC-97)~~

WRC-2000 Agenda Item 1.17

To consider possible worldwide allocation for the earth exploration-satellite (passive) and space research (passive) service in the band 18.6 - 18.8 GHz, taking into account the results of the ITU-R studies

Proposal for worldwide allocation to the Earth exploration-satellite (passive) services in the band 18.6-18.8 GHz on a primary basis

Background Information: At present, the allocations for the Earth exploration-satellite (passive) and the space research (passive) services in the band 18.6 - 18.8 GHz are on a primary basis in Region 2, but on a secondary basis in Regions 1 and 3.

The allocation to the Earth exploration-satellite (passive) service must be upgraded to primary status if the long-term ability to obtain environmental data with passive spaceborne sensors is to be preserved. Compatibility between the passive sensors and the fixed and fixed-satellite services requires adoption of constraints on the parameters of the fixed and fixed-satellite systems that use the band.

A pfd limit of -95 dBW/m^2 in a reference bandwidth of 200 MHz on geostationary systems in the fixed-satellite service will enable passive sensors to perform their mission if measurements are restricted to portions of the sensor orbit where the sensor is moving away from the equator while taking sensor data over land masses. Additionally, allowing for an exceedance of this value by 3dB for up to 5 % of the time will allow the fixed satellite service to implement power control in overcoming rain fades when needed.

Similarly, limiting the power delivered to any antenna of a station in the fixed service measured across the band 18.6 - 18.8 GHz to not exceed 0 dBW in 200 MHz along with an antenna pattern complying with Recommendation ITU-R F.699-4 will enable sharing with the fixed service.

Proposal(s):

IAP/14/53

MOD

GHz

18.6 – 18.8

Allocation to Services		
Region 1	Region 2	Region 3
18.6 – 18.8 <u>EARTH EXPLORATION-SATELLITE (passive)</u> FIXED FIXED-SATELLITE (space-to-Earth) MOD S5.523 MOBILE except aeronautical mobile Earth Exploration Satellite (passive) Space Research (passive) MOD S5.522	18.6 – 18.8 EARTH EXPLORATION-SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) MOD S5.523 MOBILE except aeronautical mobile SPACE RESEARCH (passive) MOD S5.522	18.6 – 18.8 <u>EARTH EXPLORATION-SATELLITE (passive)</u> FIXED FIXED-SATELLITE (space-to-Earth) MOD S5.523 MOBILE except aeronautical mobile Earth Exploration Satellite (passive) Space Research (passive) MOD S5.522

Reasons: To establish a common worldwide primary allocation to the Earth exploration-satellite (passive) services to be used for environmental measurements.

IAP/14/54

MOD

~~**S5.522** In making assignments to stations in the fixed and mobile services, administrations are invited to take account of passive sensors in the Earth exploration-satellite and space research services operating in the band 18.6 – 18.8 GHz. In this band, administrations should endeavour to limit as far as possible both the power delivered by the transmitter to the antenna and the e.i.r.p. in order to reduce the risk of interference to passive sensors to the minimum. In the band 18.6 - 18.8 GHz, fixed and mobile service stations shall be limited to a total power delivered to each antenna of 0 dBW.~~

Reasons: To enable passive sensors and the fixed service to operate in the band without excessive interference to the sensors.

IAP/14/55

MOD

~~**S5.523** In assigning frequencies to stations in the fixed-satellite service in the direction space to Earth, administrations are requested to limit as far as practicable the power flux-density at the Earth's surface in the band 18.6-18.8 GHz, in order to reduce the risk of interference to passive sensors in the earth exploration-satellite and space research services. The fixed-satellite service shall be limited to a power flux-density at the Earth's surface of -95 (dBW/m²) across the 18.6-18.8 GHz band for all angles of arrival. This power flux-density limit may be exceeded by 3dB for up to 5% of the time everywhere in the FSS service area. The use of this band by non-geostationary-satellite orbit fixed~~

satellite service systems with apogees lower than 20,000 km shall be in accordance with the provisions of Resolution ZZZ (WRC-2000).

Reasons: To enable passive sensors and the fixed-satellite service to operate in the band without excessive interference to the sensors. Further, studies have not been completed to determine an allowable power flux-density limit on non-geostationary fixed satellite service systems needed to protect Earth exploration-satellite service (passive).

DRAFT RESOLUTION ZZZ (WRC-2000)

**POWER FLUX-DENSITY LIMITS APPLICABLE TO NON-GSO SYSTEMS
FOR PROTECTION OF EARTH EXPLORATION-SATELLITE
SERVICE (PASSIVE) IN THE BAND 18.6-18.8 GHz**

The World Radiocommunication Conference (Istanbul, 2000),

considering

- a) that WRC-2000 made changes to the table of allocations in the band 18.6-18.8 GHz;
- b) that the power flux-density (pfd) limit in footnote MOD S5.523 of the Radio Regulations was derived solely upon consideration of geostationary-satellite orbit fixed-satellite service systems and non-geostationary-satellite orbit fixed-satellite service systems with apogees higher than 20,000 km;
- c) that initial sharing studies have indicated that low-Earth orbiting fixed-satellite service systems cause significantly greater interference into Earth exploration-satellite (passive) service sensors than do geostationary-satellite orbit fixed-satellite service systems;
- d) that further sharing studies are required of the power flux-density limit applicable to non-geostationary-satellite orbit fixed satellite service systems operating below 20,000 km for the protection of Earth exploration-satellite (passive) service systems,

resolves

that non-geostationary-satellite orbit fixed-satellite service systems operating with apogees below 20,000 km shall do so only on a non-interference basis until an appropriate power flux-density limit is determined for protection of EESS (passive) systems,

invites ITU-R

to study, as a matter of urgency, the appropriate power flux-density values to be applied to non-geostationary-satellite systems in the 18.6-18.8 GHz band to ensure protection of the Earth exploration-satellite (passive) service without unduly constraining the development of either type of system, and submit the results to a future competent conference,

instructs the Secretary-General

to bring this Resolution to the attention of the international and regional organizations concerned.

WRC-2000 Agenda Item 1.18

To consider the use of new digital technology for the maritime mobile service in the band 156 - 174 MHz and consequential revision of Appendix 18/S18, taking into account Resolution 342 (WRC-97);

Proposal to modify Appendix S18 and Resolution 342

Background Information: Appendix **S18** of the ITU Radio Regulations defines the channels of the maritime mobile service. These channels support a variety of functions including “Distress, Safety and Calling: public correspondence, inter-ship, ship/shore/ship, port operations and ship movement”. The maritime mobile frequency band, 156-174 MHz, (effectively 156-162 MHz in the Americas due to previous domestic regulatory actions), supports maritime communications worldwide. WP8B and the CPM studied this agenda item and determined that the status of the ITU-R studies indicate that revisions of Appendix **S18** to introduce new digital technologies is not possible at this conference. However, it is possible to take action to address the issue of congestion. With the rapidly increasing use of the VHF maritime mobile band, particularly for data communications, increased congestion and mutual interference is being experienced which, among others, has resulted in unacceptable degradation of the distress and safety related function for which this band is utilized. Unless action is taken this situation will only worsen as usage continue to grow.

At WRC-97, CITEL proposed simplex use of duplex channels for Appendix **S18**. This was approved for a few specific public correspondence channels only, channels 18 and 82-86. Note M to Appendix **S18** must be modified to add more channels for simplex use. This will allow for more efficient use of Appendix **S18** channels and provide flexibility for administrations to meet their immediate requirements, while maintaining compatibility with the vast number of ships and pleasure craft now using the band in accordance with Appendix **S18**.

WP8B and the CPM recommend modifications to Appendix **S18** to provide administrations with further flexibility to use the channels of Appendix **S18** in simplex mode if required. This would allow the use of duplex channels in Appendix **S18** in simplex mode and would increase the number of available channels. The cost of the change would be minimal and administrations could be able to quickly address certain local problems of congestion. Furthermore, the conference could consider permitting, subject to non-interference and no protection, the use of some of these channels or sub-bands created by the conversion of duplex channel to simplex channels for the initial testing and possible future introduction of new technologies, subject to non-operational use. This would necessarily be subject to special arrangement between interested or affected administrations.

CITEL administrations propose to modify Note M to allow simplex use of duplex channels for the remainder of the channels not already identified as simplex. CITEL administrations also propose the addition of a new Note [Z] to allow the use of the simplex channels per Note M for the testing and development of new technologies on a non-operational basis, subject to special arrangements between affected or interested administrations.

In addition CITEL administrations propose to modify Resolution **342** to continue the study of one or more new interoperable technologies for the maritime mobile service.

Proposal(s):

APPENDIX S18
Table of transmitting frequencies in the VHF
maritime mobile band

IAP/14/ 57

MOD

(See Article S52)

NOTE – For assistance in understanding the Table, see notes *a) to n)* below.

Channel Designator	Notes	Transmitting frequencies (MHz)		Inter- ship	Port operations and ship movement		Public corres- pondence
		Ship stations	Coast stations		Single frequency	Two frequency	
16		156.800	156.800	DISTRESS, SAFETY AND CALLING			
76	n)	156.825			x		
17	g)	156.850	156.850	x	x		
77		156.875		x			
18	m) [z)]	156.900	161.500		x	x	x
78	m) [z)]	156.925	161.525		x	x	x
19	m) [z)]	156.950	161.550		x	x	x
79	m) [z)]	156.975	161.575		x	x	x
20	m) [z)]	157.000	161.600		x	x	x
80	m) [z)]	157.025	161.625		x	x	x
21	m) [z)]	157.050	161.650		x	x	x
81	m) [z)]	157.075	161.675		x	x	x
22	m) [z)]	157.100	161.700		x	x	x
82	m) [z)]	157.125	161.725		x	x	x
23	m) [z)]	157.150	161.750		x	x	x
83	m) [z)]	157.175	161.775		x	x	x
24	m) [z)]	157.200	161.800		x	x	x
84	m) [z)]	157.225	161.825		x	x	x
25	m) [z)]	157.250	161.850		x	x	x
85	m) [z)]	157.275	161.875		x	x	x
26	m) [z)]	157.300	161.900		x	x	x

86	$\frac{m)}{[z]}I$	157.325	161.925		x	x	x
27	$\frac{m)}{[z]}I$	157.350	161.950		<u>x</u>	x	x
87		157.375			x		
28	$\frac{m)}{[z]}I$	157.400	162.000		<u>x</u>	x	x
88		157.425			x		
AIS 1	$l)$	161.975	161.975				
AIS 2	$l)$	162.025	162.025				

Notes referring to the Table

Specific notes

IAP/14/ 58

MOD

$m)$ These channels (~~18 and 82 to 86~~) may be operated as single frequency channels, subject to special arrangement between interested or affected administrations.

Reasons: Adding more channels for simplex use will allow for more efficient use of Appendix **S18** channels and provide flexibility for administrations to meet their immediate requirements, while maintaining compatibility with the vast number of ships and pleasure craft now using the band in accordance with Appendix **S18**.

IAP/14/ 59

ADD

$[z)]$ These channels may be used for the testing and development of new technologies on a non-interference, no protection, non-operational basis. Such use is subject to special arrangement between interested or affected administrations.

Reasons: May permit facilitation of the development and testing of new technology. Use of channels for the development and testing of new technologies may, in turn, encourage maritime radio equipment manufacturers to advance or accelerate such development and testing.

IAP/14/ 60

MOD

RESOLUTION 342 (WRC-972000)

**Review of new technology to provide improved efficiency in the use of the band
156-174 MHz by stations in the maritime mobile service**

IAP/14/ 61

MOD

The World Radiocommunication Conference (~~Geneva, 1997~~Istanbul, 2000),

considering

IAP/14/ 62

MOD

a) that the agenda of ~~WRC-97~~ this Conference includes ~~d~~ the consideration of the use of Appendix **S18** to the Radio Regulations in respect of maritime mobile communications and the use of new technology for maritime radiotelephony channels;

b) Recommendation **318 (Mob-87)**;

c) that Appendix **S18** identifies frequencies to be used for distress and safety communications on an international basis;

d) that the introduction of new technology in the maritime mobile service shall not disrupt distress and safety communications in the VHF band including those established by the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended;

e) that ITU-R is conducting studies on improving efficiency in the use of this band, and that these studies are still ongoing;

f) that changes made in Appendix **S18** should not prejudice the future use of these frequencies or the capabilities of systems or new applications required for use by the maritime mobile service;

g) that the congestion on Appendix **S18** frequencies calls for the implementation of efficient new technologies;

h) that the use of new technology on maritime VHF frequencies will make it possible to better respond to the emerging demand for new services,

noting

IAP/14/ 63

SUP

~~that some administrations are considering adopting some of the above changes to their operations within the Appendix **S18** frequencies,~~

IAP/14/64

ADD

a) that digital systems have been successfully implemented in portions of the land mobile service.

IAP/14/ 65 b) that the use of mobile telephones (PCS and Cellular) along the coast had led to the reduced use of maritime public correspondence systems,
ADD

resolves

IAP/14/ 66 a) that ~~WRC-99~~ a future World Radiocommunication Conference should consider the use of new technology in the band 156-174 MHz and consequential revision of Appendix S18 if necessary;
MOD

IAP/14/ 67 b) that in order to provide full worldwide interoperability of equipment on ships, there should be one technology or more than one interoperable worldwide technology implemented in Appendix S18,
ADD

invites ITU-R

IAP/14/ 68 to continue studies on the following with a view to providing a report to ~~WRC-99~~ a future WRC and identify the future requirements of the maritime mobile service. If the requirements warrant the replacement of existing technology with new technology then:
MOD

IAP/14/ 69 a) ——— to identify the future requirements of the maritime mobile service;
SUP

IAP/14/ 70 b)a) to identify suitable technical characteristics of the system or interoperable systems to replace existing technology;
MOD

IAP/14/ 71 e)b) to identify necessary modifications if required, to the frequency plan contained within Appendix S18;
MOD

IAP/14/ 72 d)c) to recommend a timetable for the introduction of new technology if required, and a transition plan ~~the necessary changes~~;
MOD

IAP/14/ 73 e)d) to study and recommend how new technology can be introduced without harming the distress and safety requirements,
MOD

instructs the Secretary-General

to communicate this Resolution to the International Maritime Organization.

Reasons: These modifications do not restrict the new technology to digital or to one technology; all available technologies should be studied, as new technologies are constantly emerging. It is spectrally inefficient to set aside spectrum, which is already extremely congested, for a new technology that has not yet been determined.
